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Total Number of Pages in This Submission 9

Application Number	09/493,350
Filing Date	January 28, 2000
First Named Inventor	John Brewer
Art Unit	1764
Examiner Name	H. Tran

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Firm Name	Hedman & Costigan, P.C.		
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Date	December 22, 2005	Reg. No.	34,563

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696-250

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:

John Brewer et al.

Serial No.: 09/493,350

Group Art Unit: 1764

Filed : January 28, 2000

Examiner : H. Tran

For : MULTI-ZONE CRACKING FURNACE

New York, NY 10036  
December 22, 2005

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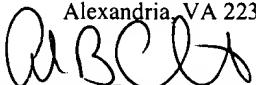
**REPLY TO EXAMINER'S ANSWER**

Sir:

Applicants submit the present brief, in triplicate, in response to the Examiner's Answer, dated October 26, 2005, and in support of a Notice of Appeal filed on February 3, 2005 in the above-identified application. Reversal of the Examiner's rejections respectfully is requested based on the following arguments.

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Alan B. Clement, Reg. No. 34,563

**STATUS OF CLAIMS**

Claims 1-12 are the only claims pending in the present application. The rejection of these claims is appealed herein.

**GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

The issues on appeal are whether Claims 1-5, 8-10 and 12 as amended are unpatentable under 35 U.S.C. 102 (b) as being anticipated by or, in the alternative under 35 U.S.C 103(a) as obvious, to Thompson U.S. 2,323,498 (hereinafter “Thompson”), and whether Claims 6-7 and 11-12 are unpatentable under 35 U.S.C. § 103(a) over Thompson in view of United States Patent No. 6,159,001 or 5,711,661 to Kushch et al.

## ARGUMENT

In the Examiner's Answer, the Examiner restates the basis for rejection as set forth in the Office Actions. In addition, the Examiner added two bases of rejection not contained in the Office Actions, which are refuted in the discussion below.

As fully explained in Applicants' Substitute Brief on Appeal, submitted August 18, 2005, one of the main features of the present invention is that the claimed furnace can independently crack more than one feedstock at different conditions at the same time to provide completely different product slates.

### *Claims 1, 3, 5, 9-10*

In the Examiner's Answer, the Examiner states that the "intended use, e.g. for cracking two separate and independent feeds, is of no patentable moment in apparatus claims, and therefore instant claims 1, 3, 5, 9-10 structurally read on the apparatus of Thompson." Examiner's Answer at page 4.

Applicants assert that the preamble of claims 1, 3, 5, 9-10 are of patentable import and should be read as part of the claim as a whole. The Federal Circuit has stated that "[w]hen limitations in the body of the claim rely upon and derive antecedent basis from the preamble, then the preamble may act as a necessary component of the claimed invention." *Eaton Corp. v. Rockwell Intern. Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003); *see also Seachange Intern., Inc. v. C-COR, Inc.*, 413 F.3d 1361, 1375-76 (Fed. Cir. 2005); *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed.Cir.1999).

Step (d) of claim 1 contains the phrase "a separate and independent process coil for each said separate independent radiant zone for cracking each *said separate and independent feedstock...*" (emphasis added). The emphasized portion of the phrase, "said separate and independent feedstock" finds antecedent basis only in the preamble of claim 1, which reads: "A furnace for cracking *at least two separate and independent hydrocarbon feeds...*" (emphasis added). Therefore, according to the Federal Circuit, the preamble of claim 1 is to be given patentable weight. Thus, claim 1 (and any claim depending from it) cannot reasonably be said to read structurally on Thompson, which has "process coils" that are incapable of processing separate and independent feedstocks without mixing the feeds.

Claim 9 contains the phrase “separately and independently controlling the temperature in each of said separate and independent radiant cracking zone to crack each *said separate and independent hydrocarbon feedstock* to olefins.” (emphasis added). The emphasized portion of this phrase finds antecedent basis only earlier in claim 9, which reads: “An improved pyrolysis cracking furnace having a radiant cracking chamber wherein said improvement comprises...providing a separate and independent process coil for directing *a separate and independent hydrocarbon feedstock* through each said separate and independent radiant cracking zone...” (emphasis added). Thus, claim 9 (and any claim depending from it) cannot reasonably be said to read structurally on Thompson, which has “process coils” that are incapable of processing separate and independent feedstocks without mixing the feeds.

The Examiner then suggests that “since the apparatus of Thompson has a separate and independent coil for each zone...said apparatus is capable of cracking two separate and independent feeds and therefore cracking more than one feed is within the purview of one having ordinary skill in the art...” Examiner’s Answer at page 4. As Applicants previously stated in the Substitute Brief on Appeal, this suggestion is erroneous because the coil denoted as an “independent coil” by the Examiner is not an independent coil at all, but instead is a continuous series of conduits connected to *commonly shared inlet and outlet manifolds*. See Thompson at col. 2, lines 45-50, and Fig. 1, 4 and 5.

Such a configuration simply cannot *independently and separately* process more than one feedstock at a time because the coils are all continuously connected to the mutually shared manifolds. Thompson thereby effectively eliminates the users’ ability to crack various different feeds under various conditions to produce different olefinic product slates because the “process coils” must contain the same feedstock fed from the communally connected manifolds.

Thus, in sharp contrast to the express recitations of the presently claimed invention, the “process coils” and “manifolds” of the Thompson furnace necessarily contain the same feedstock and share the conditions of both radiant chambers. Thus, *separate and independent* cracking for various different independent feedstocks at various conditions as required by the present claims is not disclosed or suggested by Thompson and, in fact, cannot be achieved by Thompson.

*Claims 2, 4, 8, and 12*

In the Examiner's Answer, the Examiner stated that "it would have been obvious to one having ordinary skill in the art to provide more than one radiant chamber in the apparatus of Thompson since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art." Examiner's Answer at page 5. However, the Examiner ignores the fact that Thompson teaches that the purpose of the invention is to *lessen the pressure drop* in the system. (Col. 1, line 55 to Col. 2, line 6). The purpose of the current invention is to *heat and crack at least two different feedstocks* at different conditions to produce different defined product slates. In order to accomplish the lessening in pressure drop, Thompson teaches using "a plurality of substantially parallel U-shaped fluid conduits [which] are disposed which communicate, respectively, with a plurality of substantially vertical, parallel conduits..." (Col. 2, lines 45-49). Therefore, many parallel conduits are needed to lessen the decrease in pressure. This can only be accomplished if each parallel conduit is fed from the same source as its neighbor. Otherwise, it would not matter how many parallel conduits there were. For example, one source feeding into one conduit, a ratio of 1:1, would cause a large pressure drop. However, one source feeding into ten parallel conduits, a ratio of 1:10, would cause a much lesser pressure drop. Therefore, Thompson teaches that in order to have an efficient heater, source-to-conduit ratios of more than 1:1 is required. However, the present invention teaches the opposite, namely that multiple sources of different feedstocks should be used. This is in direct contrast to the teachings of Thompson because Thompson does not address (and was not concerned with) the problem solved by the present invention.

As explained on page 2 of the specification, simply combining separate furnaces, as the Examiner suggests, would require larger plants with greater numbers of reactors. However, what is needed by industry is large plants that contain small numbers of reactors (for purposes of increasing capacity). In order to accomplish this, the reactors each need to be able to handle various different feedstocks in order to produce a variety of different olefin products. Each feedstock has its own specific cracking requirements. Therefore, if conventional furnaces were simply physically combined, as the Examiner suggests, each feedstock would require its own reactor. However, in the present invention, each feedstock does *not* require its own reactor, so less reactors are required. The present invention, able to handle larger capacities with greater flexibility, therefore represents a notable advance in the state of the art.

Even if it were obvious to one of ordinary skill in the art to combine two of the disclosed furnaces (which it is not), Applicants' claimed invention would still not be taught. Combining separate furnaces in order to make a larger furnace is already taught in Thompson, but it does not result in what Applicants claims as the invention. In Thompson, it is stated that "the number of parallel fluid streams is dependent only upon the length of the heater." (Col. 1, lines 49-50). Therefore, Thompson teaches that in order to combine one of the disclosed furnaces with another, all that is necessary is to lengthen the heater. However, this would serve only to increase the amount of a *single* fluid that could be heated. In contrast, Applicants' claimed furnace can heat and crack, simultaneously and independently, *more than one* fluid. Therefore, even if two of the furnaces disclosed in Thompson were combined, that which Applicants claim as the invention would not be created.

The Examiner then stated that the same intended use comments apply. Applicants aver that the same arguments from above apply to the Examiner's comments.

Claims 4 and 8 would not be obvious for the same reasons that claim 1 is not obvious, as discussed above.

#### *Claims 6-7 and 11-12*

In the Examiner's Answer, the Examiner states that "[t]he apparatus of Thompson is substantially the same as that of the instant claims, but fails to disclose the specific material of the dividing means as claimed." Examiner's Answer at page 6. Applicants disagree with this statement for all the reasons discussed above. Additionally, because the Examiner merely relies on the Kushch et al. reference to teach the use of Nextel material in furnaces, Applicants respectfully submit that for the reasons presented above, Claims 6-7 and 11-12 are patentable over the applied art.

#### *Applicants' Response to Examiner's "Response to Argument"*

In the Examiner's Answer, the Examiner states that "the language of the instant claim does not require the aspect of cracking two separate and independent feedstocks 'at the same time.'" See Examiner's Answer at page 7. This argument is disingenuous at best. It fails because the language of the claim obviously does require the ability to crack at least two separate and independent feedstocks at the same time. Neither the Examiner nor Applicants have ever

argued that the furnace disclosed by Thompson could not be used to crack different types of feedstocks; the argument has always been whether Thompson taught a furnace that could crack different feedstocks *at the same time*. See Office Action of November 3, 2004, page 7 (“since Thompson discloses two manifolds...the two feedstocks can be introduced...*at the same time*” (emphasis added)). It is obvious that Thompson taught a furnace that could crack one type of feedstock, and then when that feedstock was consumed, be fed with a different type of feedstock for cracking. However, the furnace taught by Thompson could not be used to crack more than one different feedstock at the same time, and this is the distinction that Applicants have drawn, and which is specifically called for in the present claims.

The Examiner also states that “since Thompson discloses two manifolds 12, 12’, the two feedstocks can be introduced in two manifolds 12, 12’ at the same time or can be introduced in the manifold 11 one at a time and therefore meet the instant claims.” Examiner’s Answer at page 9. However, this cannot be true. If two different feedstocks were each introduced into one of the manifolds 12 and 12’, then, after cracking, the resultant products would be mixed together as they exited at manifold 11. See also, col. 3, lines 7-12, where Thompson teaches using a common single header for manifolds 12 and 12’, thus showing that Thompson does not teach or suggest the present claimed invention.

### *Conclusion*

Based on the above, Applicants respectfully submit that the pending claims are patentable over the cited prior art and that the rejections of the Examiner properly are reversed. Favorable action is respectfully requested and earnestly solicited.

Respectfully submitted,  
  
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